Making the Moomins : A Finnish/English Adventure

Marsh, Jackie

Routledge
2019-09-12

Marsh , J , Nordström , A , Sairanen , H & Shkul , M 2019 , Making the Moomins : A Finnish/English Adventure . in K Kumpulainen & J Sefton-Green (eds) , Multiliteracies and Early Years Innovation : Perspectives from Finland and Beyond . Routledge , London , pp. 131-147 . https://doi.org/10.4324/9780429432668-8

http://hdl.handle.net/10138/319301
https://doi.org/10.4324/9780429432668-8

unspecified
acceptedVersion

Marsh, J., Nordström, A., Sairanen H., & Shkul, M. (2019). Making the Moomins. In Kumpulainen, K. (Ed.), Sefton-Green, J. (Ed.). Multiliteracies and Early Years Innovation. London: Routledge, https://doi.org/10.4324/9780429432668

Making the Moomins

A Finnish/English adventure

Jackie Marsh, Alexandra Nordström, Heidi Sairanen, and Minna Shkul

Introduction

The Moomins are characters in a popular set of tales written by Swedish- speaking Finnish writer and artist Tove Jansson (1914–2001), first published in Finland in 1945 (Westin, 2014). The Moomin family, hippopotamus-like crea- tures, live in Moominvalley, and have featured in numerous movies and television programs. Jansson's books about the Moomin family have been translated into 45 languages, and are among the most widely translated works of Finnish literature (Kurhela, 1996). A TV series of the Moomins was aired in the United Kingdom in the 1980s, but since then, English children's main introduction to the Moomin world has been through Jansson's books.

This chapter outlines a project that was undertaken in a primary school in Sheffield, England, with a class of 6- and 7-year-old children, in which they engaged with the Moomins, first through the stories and books, but then through a series of maker activities in which they created Moomin artifacts using paper, clay, card, and Virtual Reality (VR) apps, among other materials. The children in the Sheffield class also communicated with a group of children from an Early Childhood Education and Care (ECEC) center in Helsinki, Finland, using WhatsApp, to find out about the Moomins and their land of origin, with the Finnish children providing an authentic audience for the English children's work. The aim of this chapter is to consider the value of makerspaces from a multiliteracies perspective, engaging in particular with a notion of "maker literacies". The chapter also reflects on the value of a project in which children and educators have opportunities to engage in cross-cultural dialogue. First, however, we begin by exploring the concept of "makerspaces".

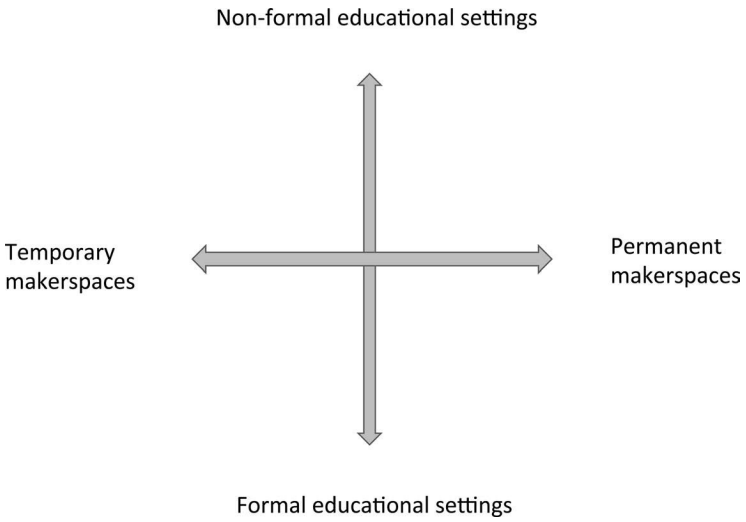
Makerspaces

This project was part of the international, EU Commission-funded project "Makerspaces in the early years: Enhancing digital literacy and creativity" (MakEY). Involving seven EU countries and the United States, the project aimed to explore the potential role and value that makerspaces could have in the early childhood curriculum. Sheridan et al. (2014, p. 507) suggest that, "Makerspaces are comprised of participants of different ages and levels of experience who work with varied media, but a commonality is that these spaces all involve making: developing an idea and constructing it into some physical or digital form". This definition is of value, because it does not limit the concept of makerspaces to those places that contain particular kinds of equipment, people, or practices, but rather, it offers a more generative notion in which spaces for making can include a wide range of both digital and non-digital resources, which are open- ended in nature. Figure 8.1 provides an overview of how makerspaces might be structured, as either permanent or temporary, situated in either formal (such as schools) or nonformal (such as libraries and museums) learning spaces.

The focus of this chapter is on a pop-up, temporary makerspace that was situated in a primary school. The growing popularity of makerspaces can be traced to the maker movement in North America, which is often stated to have been initiated by the production of the *Make* magazine in 2005, which brought together groups of makers, hackers, and tinkerers who were interested in DIY approaches to making a wide range of objects, as well as valuing the process of tinkering in which a product is not the nal aim. The movement has long-established roots in both the craft movement and in the computer hacking and open source software communities (Marsh et al., 2017). In the MakEY project, it was acknowledged that the maker movement had much to offer the contemporary early childhood curricula, given that in some of the countries involved in the

project, making has been seriously marginalized in educational contexts. Over the last few years in England, for example, Design and Technology has disappeared from the curriculum of almost half of the secondary schools that

Figure 8.1 Structures of makerspaces.



offered it as a subject, with schools focusing on subjects deemed to be more academic, such as English, Mathematics, and the Sciences (Turner, 2017). This overturns the progress that had been made in this area, given that Design and Technology had an established place in the curriculum until recent years. There has been more continuity in Finland, as the Finnish tradition of valuing crafts such as woodwork in the school curriculum continues today, with Finland embracing the educational potential of the maker movement (Marsh, Arnseth, & Kumpulainen, 2018).

There has been a range of studies indicating the value that makerspaces have for education, suggesting that they can provide participants with opportunities to develop a wide range of skills, including problem-solving, teamwork, and creative thinking (Halverson & Sheridan, 2014; Litts, 2015; Marsh et al., 2017; Stornaiuolo & Philip, 2018). Of course, schools cannot offer the kinds of induction into maker practices that open-access hack spaces and Fab labs can, as they enable novice learners to learn through an apprenticeship model, in which "hanging out" can offer valuable opportunities for acquiring knowledge and skills. Nonetheless, the provision of spaces for making in schools can lead to valuable learning opportunities (Peppler, Halverson, & Kafai, 2016). While there have been fewer projects related to early childhood, early indications are that makerspaces can contribute to creative and innovative practice (Marsh et al., 2018; Wohlwend et al., 2018). There has long been a tradition of constructivist approaches to early childhood education, in which children have been given opportunities to engage in building, painting, and so on. However, the concept of a makerspace, insofar as it is derived from the maker movement, differs from this in its emphasis on tinkering, hacking, and access to a range of resources for digital making. The aim of the project outlined in this chapter was to develop a makerspace approach to learning about the Moomins, so that the children, through design, craft, and technology, could develop a broad range of skills and knowledge while at the same time engaging in traditional literacy practices in which a love of children's literature was fostered. These kinds of practices could, to a certain extent, be thought of as the exempli cation of a multiliteracies curriculum, but we wish to propose that they also characterize what Wohlwend et al. (2018, p. 148) describe as "maker literacies".

Multiliteracies/maker literacies

For many, the starting point for the development of a multiliteracies framework is the work of the New London Group (1996), which proposed that meaning- making in the digital world involves multiple modes and media, and takes place across numerous contexts in people's lives. Since that point, research on multi-

modal, multimedia practices in the classroom has been wide-ranging, with an increasing emphasis on the role of digital technologies in meaning-making (see, for example, Knobel & Lankshear, 2010; Levy, Yamada-Rice, & Marsh, 2013; Mills et al., 2017; Parry, Burnett, & Merchant, 2016). This research has focused largely on such practices as video-making, reading and writing on screens, and the use of social media for communication, and the work on multiliteracies and multimodality has provided a useful framework for studies focusing on the relation between traditionally privileged modes (such as the written word) and other modes. The research on new/digital literacies has challenged traditional models of literacy learning in schools and it is now, arguably, more readily accepted that reading and writing involves more than the written word. Kress (2005) anticipated this situation over a decade ago in which he argued that:

In many ways, it will repay to look once again at the etymology of the English word 'read', and its origins in a family where it meant things like advice (the English '-red-' in the name Ethelred or the '-read-' in the epithet 'unready'; or the German word Rat, counsel or advice, but also Rätsel for riddle or mystery). Reading as taking meaning and making meaning from many sources of information, from many different sign-systems, will become the new common sense. (p. 17)

This is, indeed, now the new "common sense", although there is still significant resistance from policy-makers in some countries to acknowledge this change within the literacy curriculum (Sefton-Green et al., 2016).

While the multiliteracies framework is of value to research on text and artifact production in makerspaces, the nature of text production in makerspaces is such that additional models are required to understand the practices and processes that occur in them and the kinds of interdisciplinary learning that they foster, as well as to understand the nature of semiotic meaning-making when the texts and artifacts produced are so diverse. It is important to recognize that making artifacts may involve a similar process to writing text. At the crux of this argument is the understanding that communication involves a communicator, the rhetor, who wishes to communicate his or her meaning to others. The rhetor chooses the modes that he or she wishes to use to convey the meaning. A mode is a semiotic resource that is used for communication within communities, and so which carries with it socially and culturally shaped understandings of its nature. The mode is disseminated in media, and the specific medium/media chosen by the rhetor to disseminate meaning will be appropriate for needs. This description of the process of meaning-making can apply to a range of modes and media, not just alphabetic print on paper and screen.

There have been numerous models posed to embrace the complexities involved in multimodal meaning-making, such as the notion of "electracy" employed by Smith and Wargo (2017). The concept of literacy has, tradition- ally, been associated in schools with alphabetic print, and thus may be too confining a term to use when considering multimodal text production. Smith and Wargo (2017) draw on Ulmer (2003) and Morey's (2016) use of the term "electracy" to move beyond the repressive constraints embedded historically in the term "literacy" in order to characterize the kinds of meaning-making practices outlined in this chapter. They argue that the term "literacy" is too focused on traditional approaches to reading and writing alphabetic print. This approach certainly has its attractions but nonetheless, we consider "literacy" to be a useful word to continue to utilize precisely because of its history, as it may then resonate with professional groups who deal with its politically shaped instantiations on a daily basis. The concept of "maker literacies" is, in this context, of value to the field. Wohlwend et al. (2018, p. 148) describe maker literacies as "sets of practices for making and remaking artifacts and texts through playful tinkering with materials and technologies" and Marsh et al. (2018) outline the kinds of maker literacies that can occur in makerspaces in which children are given space to create texts and artifacts using a wide range of tools, including those used for digital fabrication, such as laser cutters. The notion of design is key in this context. As Bezemer and Kress (2008) note, design is:

...the (intermediary) process of giving shape to the interests, purposes, and intentions of the rhetor in relation to the semiotic resources available for realizing/materializing these purposes as apt material, complex signs, texts for the assumed characteristics of a specific audience. (p. 174)

The designer chooses the modes and medium/media most appropriate for needs, and this can also involve re-design, in that meaning-making may involve re-purposing existing modes and material. The New London Group's (1996) emphasis on design presented a shift of emphasis to a focus on the rhetor as agentive meaning-maker, with a wealth of modes and media at her or his disposal. This emphasis can also be found in the recent work on maker literacies, which also signals the necessity to look beyond conventional modes and media when considering the meaning-making process (Marsh et al., 2018; Wohlwend et al., 2018).

Developing a pedagogical framework for maker literacies

In the maker literacies framework informing the work of MakEY, the three- dimensional (3-D) model of literacy developed by Green (1988) proved useful (see also Chapter 5). Green suggested that there were three key domains that operate in relation to literacy: operational, cultural, and critical. The *operational domain* involves a focus on the skills required to decode and encode texts. When reading traditional print texts, this includes the ability to relate phonemes to graphemes and to read and write words and sentences. In considering the operational skills required for maker literacies, however, this needs to include the ability to be able to manage a range of digital tools to create and analyze texts and artifacts. The second domain identified by Green, the *critical domain*, is key to the development of critical literacy, in which texts and artifacts can be understood in relation to issues of power. Identifying the intentions of designers and producers, and how they position an audience in the production of texts and artifacts, is important in order to develop understandings about issues such as equity and diversity, persuasion, propaganda, and trust. Finally, the *cultural domain* emphasizes the importance of being able to understand texts in relation to the cultural context in which they were produced. In order to be able to create texts for a specific audience, for example, the designer/producer needs to understand the needs of the audience, which demands cultural awareness. Green (1999) himself summarizes the three domains thus:

Brie y, the operational refers to turning 'it' on, knowing what to do to make 'it' work; the cultural involves using 'it' to do something meaningful and effective, in particular situations and circumstances (for example, a Geography lesson, a workplace, etc.); and the critical entails recognising and acknowledging that all social practices and their meaning, systems are partial and selective and shaped by power relations. (p. 43)

The value of the model is that, while on the surface seemingly simple in nature, it can be used in a dynamic manner to explain complex literacy practices in ways that layer understandings of context, process, and outputs. The model is also of value in considering learning within makerspaces, given that it recognizes "the priority of an experience and activity-oriented curriculum, over an instructional curriculum, or of teaching for learning over learning from teaching" (Durrant & Green, 2000, p. 98). It is important to note that Green (1988) emphasized that these domains do not operate in isolation to each other, but overlap in various ways through the meaning-making process. The model is non- linear and integrates the operational aspects with cultural and critical domains, thus avoiding autonomous approaches to literacy (Street, 1995) in which a focus on skills taught in isolation is paramount. In this chapter, the maker literacy practices in the Moomin maker project are analyzed in relation to this 3-D model.

Further to this, the project drew on the work of Colvert (2015), who mapped Green's model on to the processes involved in semiotic meaning- making – design, production, dissemination, and interpretation. In each of these steps of the text/artifact production and reception cycles, the domains outlined by Green (operational, cultural, critical) operate. This, therefore, offers a useful model for considering children's learning when engaged in makerspace activities.

An overview of the Moomin maker project

The project was undertaken with a Year 2 class with 28 children aged 6 and 7. The school was an inner-city Church of England[1] school, and served an ethnically diverse community, though the majority of the children spoke English as a first language. Each term, the curriculum was based on a particular theme, and in the term in which the makerspace took place, the theme was "Fantasy stories".

In discussions about the MakEY project, the headteacher suggested that the children should be introduced to the Moomin stories, and that the project could therefore relate to those texts. One of the researchers involved in the project was also a parent of a child at the school, and she was Finnish (Minna). Her involvement was crucial to the success of the project, as she brought her cultural familiarity with the Moomins to it. In the planning of the project, it was also decided to build on the links developed between the Sheffield MakEY team and the Finnish MakEY team in order to enable the English children to develop a fuller understanding of Finnish culture, and so Alexandra and Heidi agreed to link up with a pre-primary class in an ECEC center in Helsinki in order to make connections with the Sheffield class.

The Finnish ECEC group that took part in the project consisted of 21 children aged 5 and 6. Out of the 21 children in the group, thirteen 6-year-old children were engaged in pre-primary education, which is part of the ECEC, and eight 5-year-old children took part in ECEC curricula. The ECEC center served an ethnically and linguistically diverse community, although Finnish was the first language of the majority of the children. The ECEC center implemented a nature-focused learning pedagogy where a large proportion of the activities and learning happens outdoors. The Finnish ECEC group worked with the following themes: science, planets, and stories, which were incorporated in the Moomin project.

The project began with the English children watching a puppet show of the Moomins presented by a professional theater group. Minna then read them some of the Moomin stories, and she also provided the children with some information about Finland in a session in which the children had opportunities to ask her questions and reflect on their prior knowledge. This provided a firm knowledge base for the children as they undertook the Moomin maker activities.

The MakEY project as a whole involved collaboration between academics, practitioners (in ECEC centers, schools, museums, and libraries), artists, and makerspace staff. In Sheffield, the research team collaborated with James Wallbank, a local maker who had set up the first accessible makerspace in the city over 10 years ago, and who currently runs his own maker business operating from the shop Makers. This intersector team was important in terms of ensuring expertise was shared and that children and teachers could bene t from the knowledge James had with regard to the possibilities of some of the new tools, including 3D fabrication tools, available for making.

During the project, data were collected in a number of ways. Researchers video-recorded the children, they talked to the children about their activities, and they wrote field notes. The children were also invited to wear GoPro cameras on chest harnesses in order to capture their experiences. These rich datasets are drawn on in this chapter to consider maker literacies in relation to Green's (1988) 3-D model of literacy. This is important in terms of providing a pedagogical framework for the work on maker literacies. The use of Green's (1988) 3-D model enables the tracing of operational skills, which are obviously of importance in a makerspace, with the wide range of tools available, but it also ensures there is a focus on the critical and cultural dimensions of meaning-making. Further, as Durrant and Green (2000, p. 98) have argued, the model also emphasizes the practical, with a strong emphasis on "the priority of an experience (and activity- oriented curriculum), over an instructional curriculum".

The operational domain

Green originally conceived of the 3-D model in relation to writing, and he emphasized that children needed to understand all relevant aspects (for example, phonics, spelling, grammar, and so on) in order to become competent authors. When this model is extended to consider other modes of communication than written language, a wider range of skills needs to be considered. One of the textual outputs of the Moomin project was a representation of a Moomin in Moominvalley, where the characters live, in VR. The steps involved in this textual production all involved a wide range of operational skills, as the children had to learn how to use a range of tools (including 3D printers) and media (including clay). The children began the process by each creating a model of a Moomin in clay. They then used an iPad to import this model into the app Qlone, which allowed them to create a 3D digital representation of the Moomin model. This 3-D digital model was then exported to a .stl file, which enabled a 3-D model of the figure to be printed. Finally, the 3-D digital

model was exported to an .obj file, which was then imported into Google Tilt Brush, and the children created a VR Moominvalley world.

This process not only involved the development of a wide range of digital skills, but it also engaged the children in the process of transduction (Bezemer & Kress, 2008; Kress, 2010), which involves moving semiotic material from one mode to another, such as oral to visual. The activities also involved remediation, "which is the shift from one medium to another (for example, from printed book to e-book)" (Haythornthwaite & Andrews, 2011, p. 42). This transduction and remediation of semiotic material is becoming more commonplace in society, as digital technologies make such processes easier and faster, but in many class- rooms, children still primarily focus on monomodal texts that remain in one medium, such as writing on paper. The Moomin project therefore offered the children valuable opportunities to reflect on the processes involved in transduction and remediation.

This process also occurred in relation to the children's hand-drawn depictions of the Moomins, which were laser cut by the maker James into wooden figures and then inserted into shoebox theaters (see Figure 8.2).

The children created plays, which they outlined in playscripts. Thus, in the project, the operational skills children developed ranged across the more traditional modes such as writing, to more contemporary forms of meaning-making, such as drawing in digital 3D, through to VR technology.

Figure 8.2 A Moomin shoebox theater.

The operational skills and knowledge the children developed ranged across the processes involved in meaning-making (that is, designing, producing, disseminating, and interpreting, as outlined by Colvert, 2015), and some of the experiences were novel to them. For example, the children had to consider how to design their VR Moominvalley using the visual mode, but in a way that was new to them in that they had not experienced previously being immersed in 3D designs in which they could view their drawings from above, below, behind, and so on. They utilized the affordances of the medium in the production of the texts, in that their 360-degree Moominvalleys made good use of the space, creating an immersive, colorful world for their Moomin figures. In terms of dis- semination, the children were able to move expertly from the written to visual modes as they presented their plays at a family assembly, showcasing their shoebox theaters.

The project therefore created numerous opportunities for the development of operational skills, and the value of these activities occurring within the context of a makerspace was that the skills extended to media and technologies that were not usual for their literacy lessons. In the context of the English National Curriculum, literacy is conceived of in a traditional, narrow manner, with an emphasis on synthetic phonics, grammar, and spelling. Projects such as this, which involve a multiliteracies approach, thus take place outside of the statutory framework. The project also led to operational skills being developed in the context of interdisciplinary work, as the children moved across literacy, science, technology, and engineering domains. This, as Peppler et al. (2016) point out, is the value of the infiltration of the maker movement into education.

One of the aspects of the operational domain that is of concern to educators is the emphasis on the teaching and learning of literacy skills in a vacuum, that is, taught for their own sake, and not located within any meaningful exercise that provides an authentic context for meaning-making. This is certainly frequently the case with regard to the teaching of phonics in English classrooms, a policy context that many teachers express concerns about (Campbell, 2018). Makerspaces can offer a valuable means of ensuring that literacy skills and knowledge are developed in the context of meaningful engagement in multidisciplinary, multimodal, and multimedia learning. While this project did lead to a range of outputs, the processes were also important in that the children were able to play, tinker, and experiment with materials and modes. Tinkering is an aspect of makerspaces that is important in developing an understanding of the properties one is using, and in enabling trial and error processes to take place (Peppler et al., 2016). Green (1988), in his emphasis on the interrelationship between the three domains of literacy, understood that the process is often more important than the product in the meaning-making process, as it enables children to play around with the rules and restrictions of a given mode/medium, and they can experiment with the resources to hand in

ways that mean the outcomes still have cultural and social value. While he did not refer to the concept of tinkering, it is very much at the heart of his model. However, in the current educational climate in England, in which schools are compared and contrasted in relation to the progress children make while in their care, tinkering is a rare phenomenon, and government policy is moving ever more swiftly away from an acknowledgment of the value of open-ended play in the early years (Ofsted, 2017). Despite this, teachers continue, where possible, to pursue projects that foster play, innovation, and creativity, of which the Moomin maker project was a good example. They recognize that such approaches do lead to the development of the kind of operational skills and knowledge traditionally valued, as well of those of relevance to the digital age. Such approaches can also enable critical reflection on texts, and text-making, as outlined in the next section.

The critical domain

Critical literacy practices are an important element of early childhood education, as the work of Comber (2013) and Vasquez (2004) in particular has outlined, and Green's 3-D model recognizes the significant place of this element in the learning process. In some of the activities in the Moomin project, critical reflections on language and the way it frames meaning were paramount. For example, Minna introduced an activity in which the children took a description of an environment in Moominvalley from one of the Jansson books, and had to trans- form it into a place with the opposite characteristics through changing adjectives and adverbs, and other aspects of the language. Beautiful, calm places could then, in this way, become scary and threatening. Bezemer and Kress (2008) suggest that changing the mode in this way is transformation, not transduction, and the transformation of texts to change viewpoint/tone and so on is one means of engaging children in critical literacy practices. However, in the Moomin project, this level of reflection could also be extended to transduction and remediation, as the children were able to reflect on, for example, how the properties of clay models of Moomins differed from 3-D models, and the differences this made when they made green-screen animated films using both, in that the plastic models were more robust for film-making.

Critical reflection was more evident in these production practices; there was less evidence throughout the project of children reflecting critically on the best ways to disseminate their texts and artifacts in order to ensure a wide, diverse audience. This was, we would argue, entirely due to the pedagogical strategies adopted, in that the emphasis was on making, as is frequently the case in makerspaces. Such spaces would bene t from more opportunities to reflect critically on the process of disseminating outputs. There may, however, be opportunities to do this in maker projects that involve some form of civic action. This was the case in Stornaiuolo and Philip's (2018) study of 45 high school freshmen as they engaged in mobilizing audiences for their maker work through a focus on collective, civic action. They argue that, "To mobilize audiences into meaningful publics oriented toward collective action, young people needed to see themselves as civic actors who could contribute to broader public conversations and whose opinions, perspectives, and experiences mattered" (Stornaiuolo & Philip, 2018, p. 1). This was the case in other case studies conducted in the wider MakEY project (see Marsh et al., 2018) in which makerspaces offered opportunities for "critical making" (Ratto, 2011), but for the Moomin project, such reflection on wider dissemination for civic engagement was not a key aim.

The cultural domain

One of the main aims of the project was to enable the children to engage with the Moomin stories as a platform for learning more about the country of their origin, Finland, thus extending their cultural understanding. In Green's 3-D model, the cultural domain relates to the way in which learners make sense of reading and writing in relation to a specific cultural context. In this case study, Finland became a place of significance for the children, and understanding the context in which the Moomin books were produced led to an enhanced engagement with the texts, and their responses to them. While the Moomins, in Jansson's books, live in a fantastical landscape, the influences of her life in Finland can be seen in them, such as the beauty of the natural landscape, the harsh winter climate, and the celebration of midsummer. The project team felt that having an understanding of Finnish culture would be beneficial in terms of offering a context for the children's maker work. In addition, if the audience for the children's products were to be Finnish children, this would provide an authentic purpose for the activities that, as previous research has indicated, is

highly motivating for young learners (Duke et al., 2007). As Magnifico (2010) argues, engaging with an authentic audience for writing can reinforce social purposes for writing, and given that writing for specific audiences is an increasingly significant aspect of communication on the internet, such practices can develop important skills that can enable children to become successful members of online writing communities in the future (Magnifico, 2010). Minna's contribution to the project was therefore significant. She led a session with the class in which she provided them with an overview of the history and culture of Finland. Minna also led the English children in a WhatsApp discussion with children in a Finnish ECEC center, in which the children exchanged facts about their lives, such as what they did at school, what they wore to school, and where they played. This background information informed the children's work through- out the week, as they discussed and produced texts and artifacts related to the Moomin characters. The responses of the Finnish children to this work were of great interest to them.

The Finnish children were excited about getting to hear what the English children had done, and what they thought about the Moomins. One of the Finnish children, Tuomo, stated that in Finland (or at least in his ECEC group), "...we all already know the Moomins, from our childhood, from home," which evidently was not the case among the English children. The ECEC group in Finland was also excited about the technology used, namely, 3D printers and laser cutters, and said that they wanted to try it themselves. Some of them had used a 3D printer at a library, but none of them were familiar with laser cutters, and they hoped that they could use one in their ECEC to make things of their own. In that sense, while the curriculum constraints for maker literacies across the two countries were quite different, there were similar limitations with regard to access to some of the newer technologies for digital fabrication.

The value of the cross-cultural exchange in this project was, arguably, the significance of offering an audience for the English children's maker work, an audience that had some interest in the topic at hand. The English children could have engaged in the production of texts and artifacts related to the Moomins without having the background knowledge about Finland that they developed, but their learning would not have been as rich, nor would they have had the authentic audience for the work that they enjoyed. The cultural domain was, therefore, significant at all stages of textual/artifact production and reception, that is, design/production/dissemination/interpretation (Colvert, 2015). There are limitations to such work, of course. It cannot be said that a WhatsApp conversation, however lengthy, can offer an extensive opportunity to exchange cultural information. In addition, the children in England did not receive direct feedback from the Finnish children on their texts and artifacts, but this would have been of great value. This was addressed in a later case study in the maker project, in which children across three countries, Australia, Denmark, and the United Kingdom, reviewed and re-purposed the texts and artifacts created in a global makerspace (Thestrup & Pederson, 2019). Nevertheless, within the practical constraints of the project, the exchanges that were undertaken in the Sheffield/Helsinki case study offered some insights into how the cultural domain of Green's (1988) 3-D model operated with this context.

Conclusion

The project was highly successful in meeting its two original aims, which were to offer a makerspace in which children could engage in making using a wide range of tools, and to develop the children's cultural understanding about the Moomin stories, and about Finland. From a multiliteracies perspective, the project demonstrated that the children were highly competent in text design and production using a wide range of tools and media. However, utilizing the concept of "maker literacies" (Wohlwend et al., 2018) leads to an expanded understanding of semiotic meaning-making, as it takes account not only of the need to develop operational skills in relation to a range of tools now available to create texts (such as 3-D printers and laser cutters), but it also signals the embodied nature of text and artifact production as they occur in makerspaces. The concepts of transduction and remediation are important to understandings of maker literacies in which children have opportunities to design and redesign texts and artifacts across a wide range of modes and media. There are particular opportunities afforded by some of the equipment used in makerspaces in this respect, in that, for example, transforming children's two-dimensional (2-D) drawings into 3-D through the use of laser cutters, or creating 3-D digital models of 3-D physical models that can then be used to 3-D print or transport into VR, can offer a means of expanding the tools available for expressing imagination. The

skills developed through these processes are also ones that are important for meaning-making in the fourth industrial revolution (Schwab, 2016), in which technological changes mean that the boundary between online and offline domains is ever more permeable, and the relation between humans and machines is ever more complex. Confidence, creativity, and competence in this area will be key to future lifeworlds.

The analysis undertaken in the chapter identities, in relation to Green's 3-D model, that makerspaces offer numerous opportunities to develop maker literacies across the operational, critical, and cultural domains, and that these domains are intertwined in nature. However, it is also suggested that specific conditions are required in order to develop children's critical capacities across all stages of text and artifact production. Specifically, there is a need to ensure that opportunities to engage in critical reflections about modes and media of dissemination are embedded in maker projects, in order that children develop a fuller understanding of the nature of specific audiences/publics, and how to reach them effectively.

Finally, the case study points to the value of projects in which children have opportunities to develop cross-cultural communication and understanding. This is a critical project in England at the moment, which is reeling from the consequences of the Brexit vote (Hobolt, 2016), and in some factions of society, retrenching into bigotism and racism (Burnett, 2017). A project in which

English children have an opportunity to reach out to children in another European country takes on a particular significance when viewed in this con- text. Further, it is important to recognize that despite the distinct differences in policy contexts between England and Finland, teachers in both countries are able to undertake creative projects in which children's design skills can be fostered and celebrated. For English educators, having their work affirmed and valued by international colleagues is of immense value in the light of the increasing standardization and formalization of the early childhood curriculum. Hall and McGinty (2015, p. 13) argue that, "...theorizing and researching resistance at a time of widespread compliance has become an urgent issue for educational researchers". Our analysis would suggest that there is a need to undertake further research on how far participating in cross-cultural projects in which educators who work within constricting policy contexts engage with professionals who operate within more liberal educational regimes can help to reaffirm the long-held beliefs of the former. This issue was not addressed within this project, but such a project would take on a particular significance in an era in which the professional worlds of some teachers are becoming more parochial by the day, shaped by the ideologies of the New Right. Such a project would not only provide a means to broaden teachers' professional horizons, but it would also reinforce the value of developing international, intercultural, and interdisciplinary understandings of the nature of education in a fast-changing world. This is particularly important in relation to maker literacies, we would argue. Given the rapid pace of development with regard to the modes and media available for meaning-making in the digital world, it is only through such global conversations that we can begin to understand collectively how maker education might develop to ensure children have opportunities to develop the kinds of skills and knowledge that will be necessary for their future lifeworlds.

Acknowledgement

This research was funded by the European Commission Horizon 2020 Program, Grant No: 734720.

Note

1. The Church of England is the established church of England, and it runs state- funded faith schools.

References

Bezemer, J., & Kress, G. (2008). Writing in multimodal texts: A social semiotic account of designs for learning. *Written Communication*, *25*, 166–195. https://doi. org/10.1177/0741088307313177.

Burnett, J. (2017). Racial violence and the Brexit state. *Race and Class*. https://doi. org/10.1177/0306396816686283.

Campbell, S. (2018). Teaching phonics without teaching phonics: Early childhood teachers' reported beliefs and practices. *Journal of Early Childhood Literacy*. https://doi. org/10.1177/1468798418791001.

Colvert, A. (2015). Ludic authorship: Reframing literacies through peer-to-peer alternate reality game design in the primary classroom. Unpublished PhD. London, UK: Institute of Education, University College of London.

Comber, B. (2013). Critical literacy in the early years: Emergence and sustenance in an age of accountability. In J. Larson, & J. Marsh (Eds.), *The SAGE handbook of early childhood literacy* (pp. 587–601). London, UK: Sage Publications.

Duke, N. K., Purcell-Gates, V., Hall, L. A., & Tower, C. (2007). Authentic literacy activities for developing comprehension and writing. *Reading Teacher*, *60*(4), 344–355.

Durrant, C., & Green, B. (2000). Literacy and the new technologies in school education: Meeting the l(it)eracy challenge? *Australian Journal of Language and Literacy*, *23*(2), 89–108.

EDUFI (Finnish National Agency for Education). (2016). *National Core Curriculum for Early Childhood Education and Care 2016. Regulations and guidelines 2017:10.*

Green, B. (1988). Subject-speci c literacy and school learning: A focus on writing. *Australian Journal of Education*, *32*(2), 156–179. https://doi.org/10.1177/ 000494418803200203.

Green, B. (1999). The new literacy challenge? *Literacy Learning: Secondary Thoughts*, *7*(1), 36–46.

Hall, D., & McGinty, R. (2015). Conceptualizing teacher professional identity in neoliberal times: Resistance, compliance and reform. *Education Policy Analysis*, *23*(88), 1–21. http://dx.doi.org/10.14507/epaa.v23.2092.

Halverson, E. R., & Sheridan, K. (2014). The maker movement in education. *Harvard Educational Review*, *84*, 495–504. https://doi.org/10.17763/haer.84.4. 34j1g68140382063.

Haythornthwaite, C., & Andrews, R. (2011). *E-Learning theory and practice*. London, UK: Sage.

Hobolt, S. B. (2016). The brexit vote: A divided nation, a divided continent. *Journal of European Public Policy*, *23*(9), 1259–1277. https://doi.org/10.1080/13501763.201 6.1225785.

Knobel, M., & Lankshear, C. (Eds.) (2010). *DIY media: Creating, sharing and learning with new technologies*. New York: Peter Lang.

Kress, G. (2005). Gains and losses: New forms of texts, knowledge, and learning. *Computers and Composition*, *22*, 5–22. Retrieved from http://techstyle.lmc.gatech.edu/wp-con- tent/uploads/2012/08/Kress-2005.pdf.

Kress, G. (2010). *Multimodality*. London, UK: Routledge.
Kurhela, V. (1996). Muumeista Seuraleikkiin. Matkalla Tove Janssonin Maailmaan [From the Moomins to parlour games. A journey to the world of Tove Jansson]. In V. Kurhela (Ed.), *Muumien Taikaa. Tutkimusretkiä Tove Janssonin Maailmaan [Magic of the Moomins. Expeditions to the World of Tove Jansson]*. Helsinki: BTJ Kirjastopalvelu Oy.

Levy, R., Yamada-Rice, D., & Marsh, J. (2013). Digital literacies in the primary classroom. In K. Hall, T. Cremin, B. Comber, & L. Moll (Eds.), *International handbook of research in children's literacy, learning and culture* (pp. 333–42). Oxford, UK: Wiley-Blackwell.

Litts, B. K. (2015). *Making learning: Makerspaces as learning environments*. PhD thesis. Madison, WI: University of Wisconsin-Madison. Retrieved from www.informalscience. org/sites/default/ les/Litts_2015_Dissertation_Published.pdf.

Magnifico, A. M. (2010). Writing for whom? Cognition, motivation and a writer's audience. *Educational Psychologist*, *43*(3), 167–184. https://doi.org/10.1080/00461520 .2010.493470.

Marsh, J., Arnseth, H. C., & Kumpulainen, K. (2018). Maker literacies and maker citizen- ship in the MakEY (makerspaces in the early years) project. *Multimodal Technologies and Interaction*, *2*(50). https://doi.org/10.3390/Mti2030050.

Marsh, J., Kumpulainen, K., Nisha, B., Velicu, A., Blum-Ross, A., Hyatt, D., et al. (2017). *Makerspaces in the early years: A literature review*. Sheffield: University of Sheffield: MakEY Project. Retrieved from http://Makeyproject.Eu/Wp-Content/ Uploads/2017/02/Makey_Literature_Review.Pdf.

Mills, K., Stornaiuolo, A., Smith, A., & Zacher Pandya, J. (Eds.) (2017). *Handbook of writing, literacies, and education in digital cultures*. New York: Routledge.

Morey, S. (2016). *Rhetorical delivery and digital technologies: Networks, affect, electracy*. New York: Routledge.

New London Group. (1996). A pedagogy of multiliteracies: Designing social futures. *Harvard Educational Review*, *66*, 60–92. https://doi.org/10.17763/ haer.66.1.17370n67v22j160u.

Ofsted. (2017). *Bold beginnings. The reception curriculum in a sample of good and out- standing primary schools*. London: Ofsted. Retrieved from https://assets.publishing. service.gov.uk/government/uploads/system/uploads/attachment_data/ le/663560/28933_Ofsted_-_Early_Years_Curriculum_Report_-_Accessible.pdf.

Parry, B., Burnett, C., & Merchant, G. (Eds.) (2016). *Literacy, media, technology: Past, present and future*. London, UK: Bloomsbury Publishing.

Peppler, K., Halverson, E., & Kafai, Y. (Eds.) (2016). *Makeology: Makerspaces as learning environments*. New York: Routledge.

Ratto, M. (2011). Critical making: Conceptual and material studies in technology and social life. *The Information Society: An International Journal*, *27*, 252–260. https:// doi.org/10.1080/01972243.2011.583819.

Schwab, K. (2016). *The fourth industrial revolution*. New York: Crown Business. Sefton-Green, J., Marsh, J., Erstad, O., & Flewitt, R. (2016). *Establishing a research agenda for the digital literacy practices of young children: A white paper for COST Action IS1410*. Retrieved from http://digilitey.eu/wp-content/uploads/2015/09/

DigiLitEYWP.pdf.
Sheridan, K., Halverson, E. R., Litts, B., Brahms, L., Jacobs-Priebe, L., & Owens,

T. (2014). Learning in the making: A comparative study of three makerspaces. *Harvard Educational Review*, *84*, 505–531. https://doi.org/10.17763/haer.84.4. brr34733723j648u.

Smith, A., & Wargo, J. (2017). Experiencing electracy. In K. Mills, A. Stornaiuolo, A. Smith, & J. Zacher Pandya (Eds.), *Handbook of writing, literacies, and education in digital cultures* (pp. 37–50). New York: Routledge.

Stornaiuolo, A., & Philip, N. (2018). Making publics: Mobilizing audiences in high school makerspaces. *Teachers College Record*, *120*, 1–38.

Street, B. (1995). *Social literacies: Critical approaches to literacy in development, ethnography, and education*. London, UK: Longman.

Thestrup, K., & Pederson, L. H. (2019). Making makerspaces: Where the pedagogy is makeative. In A. Blum-Ross, K. Kumpulainen, & J. Marsh (Eds.), *Enhancing digital literacy and creativity: Makerspaces in the early years*. London, UK: Routledge.

Turner, C. (2017). Design and technology GCSE axed from nearly half of schools, survey finds. *The Telegraph*. 10 March, 2017. Retrieved from www.telegraph.co.uk/ education/2017/03/10/design-technology-gcse-axed-nearly-half-schools-survey- nds/.

Ulmer, G. (2003). *Internet invention: From literacy to electracy*. New York: Longman. Vasquez, V. (2004). *Negotiating critical literacies with young children*. Mahwah, NJ:

Routledge.
Westin, B. (2014). *Tove Jansson: Life, art, words. The authorised biography*. UK: Sort of

Books.
Wohlwend, K. E., Scott, J. A., Yi. J. H., Deliman, A., & Kargin, T. (2018). Hacking toys and remixing media: Integrating maker literacies into early childhood teacher education. In S. J. Danby, M. Fleer, C. Davidson, & M. Hatzigianni (Eds.), *Digital childhoods – technologies in children's everyday lives* (pp. 147–62). Cham, Switzerland: Springer.